

**What is claimed is:**

1. A transmission power control method for a CDMA communication system which performs communication between a basestation and a plurality of mobile stations; the transmission power control method comprising the steps of:

5       transmitting an uplink power from the plurality of the mobile stations to the basestation;

          receiving and measuring the uplink power transmitted from each of the plurality of mobile stations with a received SIR and a SIR requirement threshold at the basestation;

10       taking an iterative algorithm to get a convergent transmitted power.

2. A transmission power control method according to claim 1, wherein the iterative algorithm expresses that a (n+1)th transmitted power of the mobile station i equals a convergence factor multiplied with a (n)th transmitted power of the mobile station i,

15       wherein the convergence factor at the nth iteration equals a power convergence factor  $c^{(n)}$  at the nth iteration over a determined factor ( $\rho^{(n)}$ ) at the nth iteration.

3. A transmission power control method according to claim 1, wherein the determined factor ( $\rho^{(n)}$ ) equals the received SIR of mobile station i at the nth iteration ( $\gamma_i^{(n)}$ ) over the SIR requirement threshold at the basestation for mobile station i ( $\beta_i$ ).

20       4. A transmission power control method according to claim 3, wherein the iterative method at the nth iteration further chooses the power convergence factor ( $c^{(n)}$ ) at the nth iteration similar to the determined factor ( $\rho^{(n)}$ ) at the nth iteration, i.e.

$$c^{(n)} \approx \rho_i^{(n)} = \left( \frac{\gamma_i^{(n)}}{\beta_i} \right).$$

25       5. A transmission power control method according to claim 1, wherein the power convergence factor is determined from the local information of the received SIR and the SIR requirement threshold in a target cell.

6. A transmission power control method according to claim 5, wherein the power

convergence factor is the maximum value of  $(\frac{\gamma_j^{(n)}}{\beta_j})$  of all the mobile stations in the target cell.

7. A transmission power control method according to claim 5, wherein the power convergence factor is the minimum value of  $(\frac{\gamma_j^{(n)}}{\beta_j})$  of all the mobile stations in the

5 target cell.

8. A transmission power control method according to claim 5, wherein the power convergence factor is the average value of  $(\frac{\gamma_j^{(n)}}{\beta_j})$  of all the mobile stations in the target cell.

9. A transmission power control method according to claim 1, wherein the algorithm is simulated under conditions of:

assuming that there are M mobile stations uniformly distributed in each cell with different SIR requirement thresholds; and

applying the large-scale fading propagation model in the uplink.

10. A transmission power control method according to claim 9, wherein the large-scale fading propagation model is assumed to be fixed for any particular mobile during the calculating cycle but it is variant for each mobile use.

11. A transmission power control method according to claim 1, wherein the CDMA communication system is a direct-sequence CDMA communication system.

12. A system to achieving a transmission power control for a CDMA communication system which performs communication between a basestation and a plurality of mobile stations; the system comprising:

means for transmitting an uplink power from the plurality of the mobile stations to the basestation;

means for receiving and measuring the uplink power transmitted from each of the plurality of mobile stations with a received SIR and a SIR requirement threshold at the basestation;

means for taking an iterative algorithm to get a convergent transmitted power.

13. A system according to claim 12, wherein the iterative algorithm means that a (n+1) transmitted power of the mobile station i equals a convergence factor multiplied with a (n) transmitted power of the mobile station i,

5 wherein the convergence factor at the nth iteration equals a power convergence factor ( $c^{(n)}$ ) at the nth iteration over a determined factor ( $\rho^{(n)}$ ) at the nth iteration.

14. A system according to claim 13, wherein the determined factor ( $\rho^{(n)}$ ) equals the received SIR of mobile station i at the nth iteration ( $\gamma_i^{(n)}$ ) over the SIR requirement threshold at the basestation for mobile station i ( $\beta_i$ ).

10 15. A system according to claim 14, wherein the iterative method at the nth iteration further chooses the power convergence factor ( $c^{(n)}$ ) at the nth iteration similar to the determined factor ( $\rho^{(n)}$ ) at the nth iteration, i.e.  $c^{(n)} \approx \rho_i^{(n)} = (\frac{\gamma_i^{(n)}}{\beta_i})$ .

15 16. A system according to claim 13, wherein the power convergence factor is determined from a local information of the received SIR and the SIR requirement threshold in a target cell.

17. A system according to claim 16, wherein the power convergence factor is the maximum value of ( $\frac{\gamma_j^{(n)}}{\beta_j}$ ) of all the mobile stations in the target cell.

18. A system according to claim 16, wherein the power convergence factor is the minimum value of ( $\frac{\gamma_j^{(n)}}{\beta_j}$ ) of all the mobile stations in the target cell.

20 19. A system according to claim 16, wherein the power convergence factor is the average value of ( $\frac{\gamma_j^{(n)}}{\beta_j}$ ) of all the mobile stations in the target cell.

20. A system according to claim 13, wherein the algorithm is simulated under conditions of:

assuming that there are M mobile stations uniformly distributed in each cell with different SIR requirement thresholds; and

applying the large-scale fading propagation model in the uplink.

21. A system according to claim 20, wherein the large-scale fading propagation model is assumed to be fixed for any particular mobile during the calculating cycle but it is variant for each mobile use.

22. A system according to claim 13, wherein the CDMA communication system is a direct-sequence CDMA communication system.

23. A basestation for communicating with a plurality of mobile terminals in a CDMA communication system, comprising:

means for receiving and measuring a uplink power transmitted from each of the plurality of mobile stations with a received SIR and a SIR requirement thresholds at the basestation;

means for taking an iterative algorithm to get a convergent transmitted power.

24. A basestation according to claim 23, wherein the iterative algorithm means that a (n+1) transmitted power of the mobile station i equals a convergence factor multiplied with a (n) transmitted power of the mobile station i,

wherein the convergence factor at the nth iteration equals a power convergence factor  $c^{(n)}$  at the nth iteration over a determined factor  $\rho^{(n)}$  at the nth iteration..

25. A basestation according to claim 24, wherein the determined factor  $\rho^{(n)}$  equals the received SIR of mobile station i at the nth iteration  $\gamma_i^{(n)}$  over the SIR requirement threshold at the basestation for mobile station i  $\beta_i$ .

26. A basestation according to claim 25, wherein the iterative method at the nth iteration further chooses the power convergence factor  $c^{(n)}$  at the nth iteration similar to the

determined factor  $\rho^{(n)}$  at the nth iteration, i.e.  $c^{(n)} \approx \rho_i^{(n)} = (\frac{\gamma_i^{(n)}}{\beta_i})$ .

27. A basestation according to claim 24, wherein the power convergence factor is determined from a local information of the received SIR and the SIR requirement

threshold in a target cell.

28. A basestation according to claim 27, wherein the power convergence factor is the maximum value of  $(\frac{\gamma_j^{(n)}}{\beta_j})$  of all the mobile stations in the target cell.

29. A basestation according to claim 27, wherein the power convergence factor is the minimum value of  $(\frac{\gamma_j^{(n)}}{\beta_j})$  of all the mobile stations in the target cell.

30. A system according to claim 27, wherein the power convergence factor is the average value of  $(\frac{\gamma_j^{(n)}}{\beta_j})$  of all the mobile stations in the target cell.

31. A basestation according to claim 23, wherein the algorithm is simulated under conditions of:

assuming that there are M mobile stations uniformly distributed in each cell with different SIR requirement thresholds;

applying the large-scale fading propagation model in the uplink.

32. A basestation according to claim 31, wherein the large-scale fading propagation model is assumed to be fixed for any particular mobile during the calculating cycle but it is variant for each mobile use.

33. A basestation according to claim 23, wherein the CDMA communication system is a direct-sequence CDMA communication system.